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APRIL

THE MGA BULLETIN

1951

No. 23

ORGAN OF THE MUSHROOM GROWERS' ASSOCIATION

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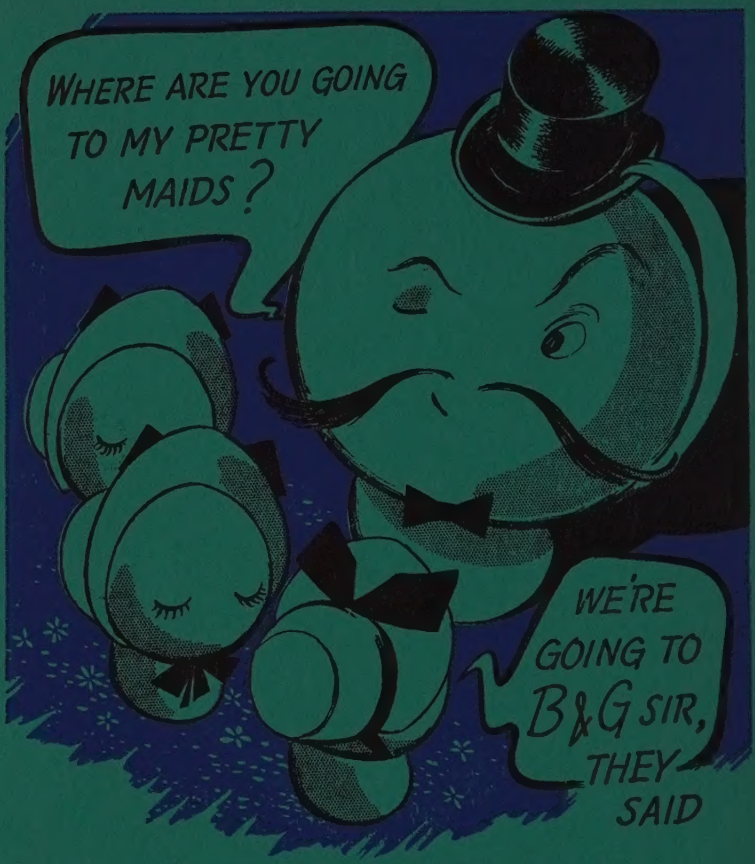

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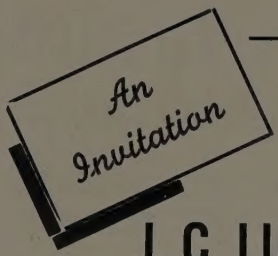

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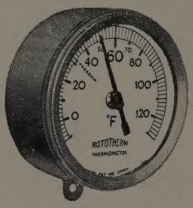

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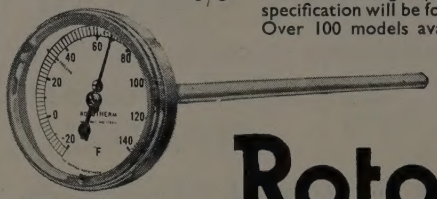

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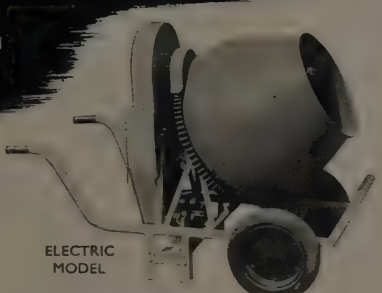

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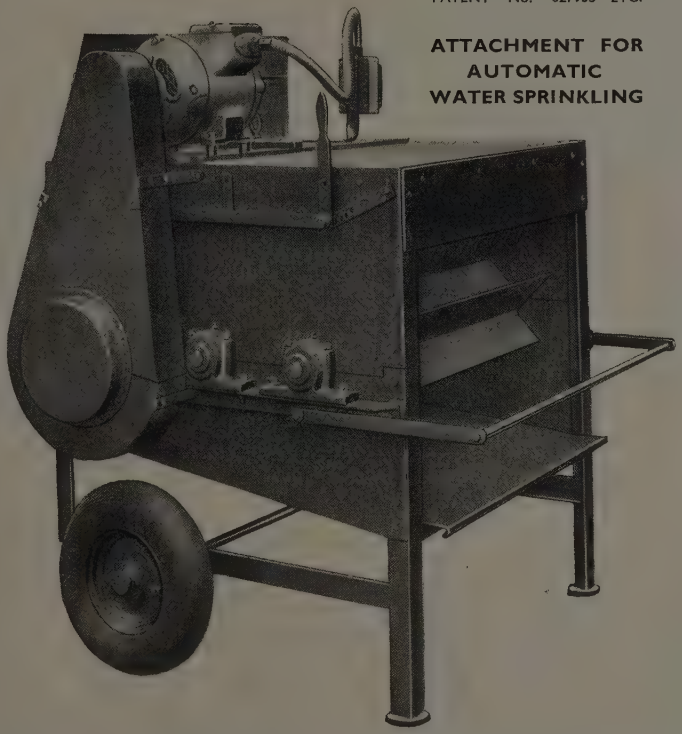

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THE

APRIL 1951

BULLETIN No. 23

No responsibility can be accepted by the Editor, the Editorial Board, or the Mushroom Growers' Association, for statements made or views expressed in this Bulletin, or for any advertisements included in this publication.

Open Day Trade Show

The next big date in our calendar is Thursday, 3rd May, when the Research Station Open Day and the Mushroom Trade Show will be held at Yaxley.

Last year we had more than 500 visitors and there is every indication that the numbers will be exceeded this time.

A number of special shows are being arranged for your inspection and interest and the Trade Show itself will be larger. Catering is being arranged on the site and a Snack Bar will be open all day long ; we have obtained a licence for a Bar to be open from 11 a.m. until 3 p.m. Tickets for a three-course lunch can be obtained from this office, price 6/- each.

A fact which is not generally known is that Capital Expenditure by the Mushroom Research Association is not eligible for the Ministry's 75% grant. This has prevented us building a very necessary addition to the laboratory, namely a Disease Room for Miss Duncan, our Microbiologist, to carry out experiments. To overcome this difficulty we propose on the 3rd May, with the kind co-operation of Messrs. Noble Mushroom Ltd., to allow members to visit that farm, by ticket which can be obtained from the Information Tent, price 5/-. It is hoped that by this means a sum in the region of £50 will be raised. This will enable a small Disease Room to be built. New methods of disease control and new fungicides can then be tested.

The programme will be sent out to all members this month, giving times of trains and 'buses and data relating to the stands at the Trade Show.

NEWCOMERS TO THE M.R.A. DIRECTORATE

Mr. A. G. Pointing was born into Horticulture, his Father being a Somerset Market Gardener who is still actively engaged in the business. Mr. Pointing served throughout the first World War as a Pilot in the Royal Flying Corps, seeing active service in France. He served in the second World War as an Officer in the Royal Artillery. He is now Managing Director of Cartledge's Nurseries Ltd., of Bramley, Leeds, and also Managing Director of Agaric Ltd., Bradford-on-Avon, Wilts; the latter Company have been continuously in operation as Mushroom Growers since 1914.

Mr. McGregor Bulloch brings to the M.R.A. Board personal experience of research into Synthetic Composts, for he spent his first two years in the Industry with Noble Mushrooms Ltd., for whom he tested all the formulae published up to that time and sought means whereby the best could be improved. From Yaxley he went to France for a short period to give technical advice to the DesNous family on the erection of the first mushroom houses built in that country on American lines. Early in 1949 he went to Brigadier A. S. G. Douglas's Mushroom Farm at Blandford, which he now manages.

RESEARCH FUND, 1951

THIS YEAR'S TARGET IS £1,500

The Target this year is £1,500, but we ought to exceed it, for research is potentially so significant that such a sum should be considered well within our capabilities. Our main Appeal last Autumn met with an immediate and encouraging response.

Messrs. Francis Nicholls Ltd. wrote : " We hope that means will be found to enable research to be continued on the same scale as hitherto, as we are convinced that it is in the best interests of the Industry that this should be done. Whilst we appreciate that owing to the lower prices ruling it will be more difficult to secure the necessary finance, we are strongly of the opinion that **it is in times such as these that research assumes its greatest importance,** as it should enable Producers to reduce, if not eliminate entirely, the risk of suffering loss from pest and disease. Consequently, in the event of financial support being secured to enable you to continue on approximately the same scale as hitherto, our present intention is to subscribe the same amount as in previous years, viz. **one hundred guineas."**

The Chairman replied : " I am writing at once to tell you how very much we appreciate your latest gesture of enlightened generosity. It encourages us at a critical moment to push ahead boldly with our efforts to establish the Yaxley Research Station on a sounder financial footing. We are particularly pleased to read your reference to the special need for research at a moment when prospects are grimmer than they have been for 10 years, and with your permission we shall publish your letter in the hope that hesitant growers will take comfort in your words and act on your advice."

Messrs. Broome & Green (London) Ltd., subscribed 25 Guineas, **Noble Mushrooms Ltd.,** £25, and **Mr. W. A. B. Harding, Capt. G. P. Lawrence** and **Mr. John Stewart-Wood,** £20 each. **Mr. John Yoder** and **Dr. James W. Sinden** sent generous donations from the United States, and **Mrs. H. F. G. Robertson** and **Mr. M. Denny** from South Africa. The **Count Da Schio** (Italy) and **Mr. W. Walravens** (Belgium) were other overseas contributors.

This year a number of growers are helping us considerably through the medium of Banker's Orders. **General Sir Oliver Leese,** former M.R.A. and M.G.A. Chairman, is most generously subscribing £30 in this way. He gives his reason for doing so : " *We are so grateful to you for all the help given to us by the Research Association in ridding us of Red Geotrichum. I hope all goes well.*"

Others are Mr. Clifford King (30/- per month), Mr. H. Kilian (25/- per month), Mr. R. H. Fletcher (£1 per month), Col. W. A. Turner and Mr. R. H. White (each 10/- per month), Col. H. G. Bell (£5 5s. per year), and Mr. W. Makowski (5/- per month).

These constant appeals for money are a drain on you and a strain on us. Let us all make a big effort NOW to reach our target, and thereby enable the Research Staff to continue their work unhampered by financial anxiety.

The thanks of us all at Yaxley go to the following whose contributions were received before 1st February, 1951 :

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Nicholls, Francis & Co. Ltd.	105	0	0
Broome & Green (London) Ltd.	26	5	0
Noble Mushrooms Ltd.	25	0	0
Harding, W. A. B.	20	0	0
Lawrence, Captain G. P.	20	0	0
Stewart-Wood, J.	20	0	0
Yoder, John (U.S.A.)	17	10	0
Murphy Chemical Co. Ltd.	10	10	0
Robertson, Mrs. H. F. G. (S. Africa)	10	10	0
Denny, M. (S. Africa)	10	0	0
Dumbreck, R. D.	10	0	0
Gibbons, J. S.	10	0	0
Hedon Growers Ltd.	10	0	0
Wills, A. R. Ltd.	10	0	0
Sinden, Dr. J. W. (U.S.A.)	8	15	0
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Leeney, A. G.	6	6	0
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Jackson, Geo. & Co. Ltd.	5	5	0
Allnutt, F.	5	0	0
Bardsley, F. M.	5	0	0
Bourke, Brig. H. S. J.	5	0	0
Davey, T. W. Ltd.	5	0	0
Irish Nurseries (Ryan M. J.)	5	0	0
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Morgan, Wm. & Co. Ltd.	5	0	0
Stedall, G. St. G.	5	0	0
Thompson, J. R.	5	0	0
Berry, A. St. J.	4	4	0
O'Connor, General Sir Richard	4	0	0
Clarke, M. S.	3	16	0
Lichtarowicz, L.	3	0	0
Bradford Fertilizer Co.	2	2	0
Brown, H. A.	2	2	0
Johnson, Capt. M. M.	2	2	0
Luxmoore, M. C.	2	2	0
Stevens, W.	2	2	0
Trusler, W. J.	2	2	0
Wild, R. F.	2	2	0
Hill, J. L.	2	0	0
Red House Mushrooms	2	0	0
Schio, Cont Alvise Da (Italy)	2	0	0
Wright, C. W.	2	0	0
Miller, Miss S. A.	1	10	0
Boland, Miss E. M.	1	1	0
Bradley, K. C.	1	1	0
Currie, W. D.	1	1	0
Fell, N. W.	1	1	0
Newey, S. A.	1	1	0
Parkinson, Geo.	1	1	0
Simpson, W. A.	1	1	0
Thirsk, G.	1	1	0
Touche, Dr. C. J. La	1	1	0
Johnston, A. E.	1	0	0
Walravens, W. (Belgium)	1	0	0
Watts, J.		10	0
	£468	3	0

The following complete the list of donations received in 1950 : F. Bleazard £2 (second contribution), Col. W. A. Turner £1 10s. (fourth contribution), Clifford King £1 10s. and R. White, 10s.

M.R.A. Annual Meeting : The Annual Meeting of the Mushroom Research Association Ltd. was held in Peterborough on 23rd January. Mr. Fred. C. Atkins (Northants) was re-elected Chairman, Major C. P. Whitaker (Norfolk) Vice-Chairman, and Messrs. Stephenson, Smart & Co. Auditors. It was reported that Growers and others interested in Mushroom Growing had contributed, during 1950, the sum of £1,954 towards the maintenance of Research and that the Ministry of Agriculture had contributed the balance, representing 60% of the year's expenditure. Fluctuation in the prices of mushrooms which in 1950 fell to the lowest level for 10 years was given as the reason for applying to the Ministry for the additional 10% grant.

Important Papers for the Library

PHOTOSTAT SERVICE

The following important publications have now been added to the M.G.A. Library. They are photographed from original papers which are out-of-print or not otherwise available to us, and we are indebted to the Photostat Service provided by the Science Museum Library in South Kensington.

To comply with the Copyright Act, a signed declaration in the following terms is required from anyone borrowing these papers: "Please lend me.....I certify that I require the above photograph copy for the purpose of private study, research, criticism or review, and I undertake not to sell or reproduce for publication the copy supplied."

JOAN A. T. ANDERSON	Gall-Midges (Cecidomydiae) Whose Larvae Attack Fungi.
GEO. F. ATKINSON	The Development of Agaricus Campestris.
L. CAESAR	Paradichlorobenzene as a Control for the Mushroom Mite.
VERA K. CHARLES & C. H. POPENOE	Some Mushroom Diseases and Their Carriers.
BARBARA COLSON	The Cytology of the Mushroom Psalliota Campestris Quel.
C. C. COMPTON	Role of Light Traps in Control of Mushroom Springtail.
C. C. COMPTON	Factors relating to the Control of the Mushroom Mite, Histiostoma Gracilipes Banks.
FREDERICK CURREY	Notes on British Fungi.
DONALD FREAR, J. F. STYER & D. E. HALEY	A Study of the Effect of H-ion Concentration on Growth of Agaricus Campestris.
O. E. GAHM	Mushrooms—A Mite.
ORVE K. HEDDEN AND C. R. NEISWANDER	Equipment for Burning Sulphur in Empty Green-Houses and in Mushroom Houses for the Destruction of Mites and Insects.
L. HASEMAN & H. O. EZELL	The Eelworm (Rhabditis Lambdiensis) A New Pest of Mushrooms.
S. G. JARY & J. H. STAPLEY	Observations upon the Tyroglyphid Mite (Histiostoma Rostro-Serratum) Megnin.
C. H. KAUFFMAN	Klebs' Theory of the Control of Developmental Processes in Organisms, and its Application to Fungi.
ALBERT M. KLIGMAN	Control of Fungi in Mushroom Casing Soil by Sterilization with Chloropicrin.
HERMAN & HENRY KNAUST	Method of Producing Mushrooms. Patent 2,034,678.
HERMAN & HENRY KNAUST	Means for Producing Mushrooms. Patent 2,097,766.
F. LABROUSSE	Les Maladies Verticilliennes du Champignon de Couche.
SYDNEY G. PAINE	A Brown Blotch Disease of Cultivated Mushrooms.
F. PASSECKER	Ein neuer Unkrautpilz auf Champignonbeeten. (Pleurotus Passeckerianus Pilat).
R. S. PITCHER	Observations on the Larval Instars of Sciara Fenestralis, Zett.
J. E. SASS	Cytology of Spore Germination in the Bispored Form of Psalliota Campestris.
B. B. STOLLER, F. B. SMITH & P. E. BROWN	A Mechanical Apparatus for the Rapid, High-Temperature Microbial Decomposition of Fibrous, Cellulosic Materials in the Preparation of Composts for Mushroom Cultures.
B. B. STOLLER	Preparation of Synthetic Composts for Mushroom Culture.
G. STEINER	Rhabditis Lambdiensis, A Nematode Possibly Acting as a Disease Agent in Mushroom Beds.
A. G. TOLAAS	A Bacterial Disease of Cultivated Mushrooms.
C. M. TUCKER & J. B. ROUTIEN	The Mummy Disease of the Cultivated Mushroom.
G. VIENNOT-BOURGIN	Les Ennemis Du Champignon de Couche.
G. VIENNOT-BOURGIN	La culture du Champignon de Couche. Dactylium Dendroides Parasite du Champignon de Couche (1).
SELMAN A. WAKSMAN & J. M. McGRATH	Preliminary Study of Chemical Processes involved in the Decomposition of Manure by Agaricus Campestris.
F. C. WOOD	Studies on "Damping off" of Cultivated Mushrooms and its Association with Fusarium Species.
F. C. WOOD	Studies on "Damping off" of Cultivation Mushrooms and its Association with Fusarium Species II.

Additions to the Library: *Mushroom News*, Vol. 3, No. 3 (presented by W. Darlington & Sons Ltd.). *French Bulletin* No. 11 (January, 1951), presented by the French M.G.A.

F. C. ATKINS, Dr. R. L. EDWARDS, Dr. P. J. BELS, Dr. E. B. LAMBERT
Dr. H. C. BELS-KONING, S. BURROWS, Dr. I. F. STOREY, Dr. N. H. PIZER
G. L. HEY, Prof. H. PALUDAN, W. CHRISTENSEN, A. WATSON
G. CHAPUIS, A. SARAZIN, Dr. U. HAUSER and Dr. E. HAUSER

JOHN STEWART-WOOD Reviews

Mushroom Science—1

"To have persuaded British Growers to discard the traditional secrecy surrounding the Mushroom Industry was an achievement in itself, but to have brought together experts from Europe and America for such a full and frank exchange of information was indeed a triumph."

The Nurseryman & Seedsman, 11.1.51.

*"Mushroom Science—I" consists of the very revealing papers given on aspects on mushroom growing by the scientists and growers who came from many countries to attend the First International Conference at Peterborough last spring. (*Photographs of all the speakers face this page*).

It has enlightened me considerably to know that the problems which I am always encountering in mushroom growing have been tackled by these people most thoroughly and practically. In these days a commercial grower cannot afford to risk experimenting too much on his crops and can learn much from the results obtained by scientists devoting their whole time to research. The results of experiments and suggestions by these scientists are set out very clearly in language and terms which all can understand. The book is also well illustrated.

One of the most revolutionary ideas is the short composting method described by Dr. J. W. Sinden of America and Dr. E. Hauser of Switzerland. About half the quantity of manure is needed to fill the same area of Mushroom beds compared with compost prepared by the usual method, and a greater weight of mushrooms per original ton of manure has been produced. This is very interesting in view of the ever-increasing shortage and rising price of manure. This system of composting also lends itself more readily to mechanisation in turning. The note of warning at the end of the paper is very wisely put, as to make a success of the new method one has to forget all about the old.

I feel that the experiments on casing soil carried out by Dr. N. H. Pizer of Cambridge on the one hand, and Dr. P. J. Bels of Holland on the other, may be the answer to many growers' problems. We too readily go to the trouble of making good composts, getting the spawn to grow to perfection, and then case the beds with a soil we think looks and feels right, and get a very poor crop. Why? I think you may find the answer in reading what Dr. Pizer and Dr. Bels have to say. There still is, of course, a great need for research on casing soil. Perhaps one day we will have a synthetic soil as well as the synthetic compost Dr. R. L. Edwards also describes in this book.

The observations on Cropping by Mr. S. Middlebrook and Dr. I. F. Storey I also found most interesting. It explains and suggests the reasons why crops vary throughout the year. Construction, insulation, heating, ventilation and cubic capacity of air space in relation to bed area have all been taken into consideration. Graphs explaining the effects of all these important factors in relation to the length of time taken to produce the 1st lb. per sq. ft., and the average yields obtained, are all illustrated. This paper makes me feel that the grower in caves is a very lucky fellow with his uniform atmosphere and temperatures.

**MUSHROOM SCIENCE—I.* Edited by Dr. R. L. Edwards and published by the International Conference on Mushroom Science, Yaxley, Peterborough, Northants. 7/6d.

Fred. C. Atkins strikes a very useful point in his paper on the Economic Duration of Cropping and supplies the complete data as compiled on the cropping at Yaxley. Of course the economic length of cropping will vary with the different types of cultivation, e.g., cellars, shelves and trays, and most of all soil conditions.

The use of Ground Gypsum to correct horse-manure compost, and its effect on the pH value of composts, is gone into very thoroughly by Dr. Pizer in another paper. He explains the range of pH values, the methods by which they are taken and the influence they have on the growth of mycelium. However, the pH value of compost changes in water according to the amount used and the time of mixing, so that a pH reading does not appear to be a useful criterion of readiness for filling.

I have given only a brief survey of a few of the points in this book which impressed me. Old and new diseases and new insecticides and fungicides are discussed, and the whole collection of papers makes very interesting reading.

The First Area Meetings

TONBRIDGE AND EPPING SUCCESSES

The first meeting of its kind to initiate the new Area Meeting policy of the M.G.A. was held by the Kent Surrey Group at Tonbridge, Kent, on 28th November. A sudden dispersal of fog which had blanketed the area for several days lifted at the last moment—to the great relief of the organisers and those travelling long distances.

Introductions and informal discussion took place before dinner which was served at 7.30, and this was followed by the more formal nature of the proceedings as was inevitable at an inaugural meeting of this nature. Due to sudden indisposition, the Association's Chairman, Mr. Fred. C. Atkins, was unable to witness this first ' break ' of a ' flush ' which he had conceived, so Mr. Watson, the Association Secretary, was invited to take the chair for the evening. He welcomed the growers and guests particularly the N.A.A.S. visitors (who included Mr. O. G. Dorey, Mr. H. H. Glasscock and Mr. B. D. Moreton) on whose behalf Mr. Dorey, the Deputy Provincial Director, replied that he and his colleagues could pledge to the Group the full support of the Advisory Service.

An Area Committee of three grower-members (Messrs. W. A. B. Harding and G. W. Baker—inaugural meeting organisers and representatives on the Executive Committee and Mr. G. V. Allen) was elected to serve for a year and to make arrangements for three meetings to be held on members' farms. Seven members expressed their willingness for the Group to visit their farms, and the next meeting has since been arranged to be held at Tenterden Mushrooms (Harding Bros.) on 21st April.

The aims of these informal gatherings are to be :— Exchange of knowledge and a pooling of experience, discussion, to bring about a closer liaison between Members and Association Headquarters, eventually

to elect a representative to the Executive Committee, and last but not least to endeavour to increase membership of the M.G.A. For geographical reasons it was suggested that East Sussex should be included in the Group.

Time permitted only a few important matters to be discussed. Advertising was of very deep concern and many suggestions were heard. There was a strong feeling that members should be able to purchase advertising and publicity matter from the Association who would be in a better position to order in bulk and therefore reduce such costs to the individual grower. Hygiene on the farm formed the subject of a long and interesting debate, in particular the problem of ensuring that a contractor did not bring manure or soil in a vehicle which had recently been used for clearing away spent compost from another farm, and the rating of Mushroom Buildings was queried.

The meeting ended at 10 p.m., but it was noted that members were reluctant to regard this as the end of a very successful evening, many doubtless gossiping until the 'early hours' (as is the custom when mushroom growers get together). W.A.B.H.

THE EPPING MEETING

The second Area Meeting was held at the Thatched House, Epping, on Wednesday, 14th February, for growers and others interested in growing in the counties of Essex, Herts., Beds., Middlesex and London. Mr. J. E. R. Simons, the Executive Committee's representative in this area, organised the function in consultation with Mr. Angus Watson and Mr. Basil Harding, and 40 people attended, despite extensive flooding of the roads.

At 5 p.m. an informal discussion was initiated by Mr. Simons, who presided, supported on the top table by Mr. Fred. Atkins and Mr. Watson. The success of this second venture can be gauged from the fact that for two hours there was an unceasing interchange of question, answer, comment, criticism and good-natured repartee.

Among the subjects discussed were the avoidance of a greasy, anaerobic layer at the base of a compost heap, the necessity or otherwise (and alternative means) for pepping-up racing-stable manure, the various types of blood used as activator, the use and abuse of live steam at "peak heat," the maddening nature of soils as casing material, and American methods of growing compared with ours.

At 7 p.m. there was a break for dinner (ending happily with cultivated mushrooms on toast), and then we all split up into groups and arguments waxed and waned until the most tenacious surrendered and crept upstairs to bed—at a quarter to two the next morning!

It is proposed to hold another meeting of this group in the summer, probably on a mushroom farm. F.C.A.

FORTHCOMING AREA MEETINGS

Dates have been fixed for Salisbury, Wilts. (3rd April), Selby, Yorks. (10th April), Aylesbury, Bucks. (12th April), and Tenterden, Kent (21st April). That should be enough before the Research Open Day and Trade Show at Yaxley on 3rd May!

Mushroom Growing in Switzerland

By Dr. Clément Fleury

Mushroom growing in Switzerland is a relatively recent undertaking. Its rapid development is mostly due to the fact that, during the war, almost all importation stopped, so our country was left to its own resources. Owing to the initiative and perseverence of valiant pioneers, it nevertheless has been able to provide itself with the necessary produce. New activities were created to save the country in those hard times and among others there arose a promising industry concerned with mushroom growing.

Mushrooms were cultivated in abandoned quarries (Fig. 1 and 2) or in underground galleries or caverns, which of course had first to be fitted out. Needless to say many trials and great difficulties had to be surmounted before the necessary equipment could be installed.

At Geneva, Mr. Potdevin has been kind enough to tell us some interesting things about his great struggles in the initial stages. Now the best reward for his persistence is the actual success of his enterprise.

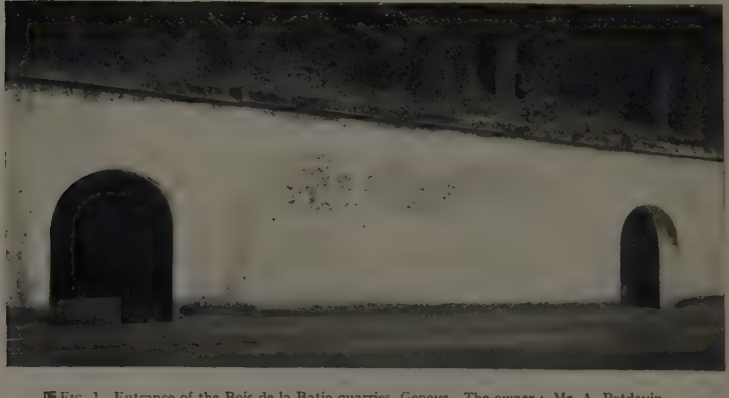


Fig. 1. Entrance of the Bois de la Batie quarries, Geneva. The owner : Mr. A. Potdevin.

One of the greatest difficulties to be overcome was the engagement of specialists. Mr. Potdevin managed to get a staff from abroad con-

sisting of French workers or of Swiss returning from France, and all of them were obliged to adapt themselves to our local conditions.

To obtain a regular supply of horse manure was also difficult, because of the shipping complications in war-time. Luckily, the necessary quantity could be furnished by Army horses.

At that time, consumption of cultivated mushrooms hardly existed in the diet of Swiss people, so that growers had to face many risks : this explains why the now well-established mushroom canning practice has only developed in recent years.

There are actually about 70 mushroom centres distributed in several cantons ; fifteen of them have been established in Latin Switzerland.

In most of the underground growing-rooms (caverns and caves), the production goes on during all seasons of the year, but in some regions, as for instance in the Jura, no winter crop is to be expected, the very low temperatures of this district requiring too great a financial outlay on artificial climatisation systems.

FIG. 2. A successful crop obtained in the quarries of the Bois de la Batie. The beds slope away to each side, and the three middle beds lean against each other. A space 20 cm. wide is provided along each side to form a service pathway, to facilitate filling and emptying the beds and other operations.

As a rule, mushrooms are only grown indoors, the open-air conditions being unsuitable.

As to the total production of Switzerland, it may be estimated at about 400,000 kg. per year, which is more than sufficient for Swiss consumption, including the hotels. The following figures are interesting, but maybe, misleading, as imports have been very small since 1947.

Imports of cultivated mushrooms

1938	....	253,840 kg.
1941	....	6,830 ,,
1944	....	105 ,,
1947	....	3,354 ,,

Several groups of mushroom growers have been constituted, the most important among them being the Association Suisse des Champignonnistes, which includes about two-thirds of the growers. Other small groups are affiliated to the Syndicat Romand or to the canners Kunz at Lucerne.

The economic situation of mushroom growers in Switzerland is far from flourishing compared to that of their colleagues abroad, " price control," instituted during the war, having reduced profits to a minimum. Only through constant improvement in cultural practice—which is the best way to increase yields—will it be possible for them to cover the great financial expenditure for raw material and to pay the high wages Swiss workers can command.

The growers have prescribed a high standard of quality for the market, and strive always to provide their customers with excellent and perfectly fresh mushrooms.

Spawn for bed planting is obtainable on the Swiss market, under different forms, as compressed bricks made of manure, or grain spawn (wheat or maize).

Formerly the spawn was imported from France. During the war it could be obtained from Hungary ; now we get it from England, or make our own.

The manufacture of mushroom spawn is subject to a highly technical procedure, requiring laboratory apparatus and a knowledge of pure-culture methods. As our Federal Research Station is equipped for this kind of work, we undertook during the war and until 1946—in the absence of mycelium from abroad and of Swiss spawn makers—to supply the growers with this essential propagating material.

Lately the scientific study of problems in connection with selection has been developed at the Institut de Botanique Generale at Geneva, under the direction of Professor Chodat, with the collaboration of Mr. P. Martin. Its contributions have thrown light on several very interesting aspects of this question.

May the relationship between mushroom growers in different countries grow closer for the great benefit of the workers' knowledge and for the sake of a fascinating problem worthy of the greatest interest !

Subscriptions are Now Overdue

Our Annual Meetings used to be held at the end of November. On several occasions they were marred by fog. To avoid this risk the Executive decided early in 1950 to advance the date to early October. Our financial year now starts on September 1st and ends on 31st August. Subscriptions are due on 1st September, but members are given five months grace and sent two Bulletins (October and January) pending the receipt of their cheques. After February the Secretary can only assume that those who have not paid do not wish to resume their membership.

THE NEW "34"

STANLEY MIDDLEBROOK SPEAKS HIS MIND

There were only two major criticisms one could make of Dr. Ware's Bulletin "34." It contained no detailed index and there were insufficient sub-headings in the text, making easy quick reference absolutely impossible. These faults have been avoided in the latest (1950) edition revised by Mr. H. H. Glasscock, but when this is said it is difficult to find in what respects the new 3/6d. version is an improvement on the old 1/6d. Bulletin; or even to see why revision was necessary, since there is little that is new or up-to-date in the revision.

I find the book most disappointing, for while I admit the revision of another's classic is an unenviable task, Mr. Glasscock has only risen to it to the extent already mentioned.

The old "34" was accepted as the standard work on Mushrooms, almost indeed the Mushroom Grower's bible, and was reputed to be a M. of A. "best seller." Will it retain that honour? In its latest form with its several omissions and its failure to bring itself up-to-date I predict it will give pride to place to Mr. Atkins' "Mushroom Growing To-day," which has the advantage of being written by one who, being in daily contact with commercial growing, its problems, successes and failures, knows the value of the latest possible information.

From a readability standpoint the new edition certainly lacks the grace and charm of Dr. Ware's work, just as it lacks his explanatory and interesting discussions and asides which were such an engaging feature of his writing.

SOME OMISSIONS—

There are some serious omissions in a book dated 1950. I find no reference to the Tray or "two-zone" system; no stated indication that the modern tendency is towards small houses; no mention of the latest insecticides, except for fragmentary remarks on DDT and BHC. (I gather the M. of A. are always hesitant about recommending new insecticides or fumigants, but BHC—that is, Gammexane—**has** been proved); no reference to Dr. Edwards of the Mushroom Research Station and his work on synthetic composts, an item most lamentably omitted from Appendix I ("Substitutes for horse manure"), in favour of obsolete paragraphs on cow, pig and sheep manure, though Stoller's 1943 work has scraped in by the skin of its teeth. These grave omissions seriously detract from the value of a book whose first sentence in the Foreword says; "The aim of this Bulletin is ..... to acquaint the reader with recent developments such as the value of various substitutes for stable manure ....." It is only fair to say, however, that Mr. Glasscock is aware of some of the omissions. The explanation seems to be delay on the part of H.M. Stationery Office in getting down to the printing. The edition is dated 1950 as also is the Foreword. I understand it went to the printers over a year ago and the first copies came through in December, 1950. Yet the latest references I can find are to Pizer and Leaver, 1947 (Soils) and Atkins, 1948 (Bacterial pit). It

would almost appear that no attempt has been made to include the last two years' work. If a textbook is to bear a 1950 publication date provision ought to be made for last-minute additions just prior to the copy being sent to the printer, if necessary in the form of an appendix. If this is impossible a foreword should make it clear that " recent " means anything up to two years **before** publication date.

The only section that does seem to have been re-written and brought reasonably up-to-date is that dealing with soil. It is factual and concise though it would be as well to read it in conjunction with the same section by Dr. Ware in which the afore-mentioned " discussions and asides " promote several ideas. Indeed each version on soils provides what the other omits.

There are also two useful but by no means exhaustive paragraphs on House Heating.

—AND SOME CRITICISMS

There are many items, some brought forward from the old " 34," which invite criticism. The author must be regrettably out of touch to write on page 1 : " It is well to make sure that the source of manure is not likely to fail in the foreseeable future."

It is common in most descriptions of composting to illustrate diagrammatically what happens in the stack. All editions of " 34 " so far have omitted this valuable aid to the study of good compost making.

Under " Factors affecting fermentation " we read " Towards the outside of the manure . . . . . organic matter of the manure may be completely destroyed and become ' firefanged ' ", the inference being that it is destroyed **because** it is " firefanged "—surely very misleading ; " firefang " according to most growers and authorities is desirable rather than destructive.

To say (p. 9) that " on the whole, growers are well advised to ignore pH values " is nonsense unless the emphasis is deliberately on the word " growers." But even then . . . . . ?

Again (p. 15) " The use of wood in contact with beds is not desirable . . . . . " will upset 95% of English growers.

It is, apparently, " relatively simple " to test a soil on well-run spawn. Really ! I would deny that most aggressively ! In the same paragraph (p. 23) the Author states " The best soils become covered with pinheads within 10 days . . . . . poorer soils produce fewer mushrooms which grow more slowly and appear in ' flushes ' ". 10 days is **remarkably** quick, and we've all seen clearly defined flushes in **good** soils too.

The Pests and Diseases sections are much as before. Nicotine is still advocated for flies, and there is an almost fanatical adherence to Bordeaux Mixture, seemingly the cure for all ills, for several diseases. In both these fields science would not appear to have advanced at all.

The book contains 22 pages of illustrations against the previous 12. These, together with a most attractive and arresting cover in colour, tend to give a superficial advantage over " 34's " predecessor. But I shall take great care of my well-thumbed Ware " 34."

Ministry of Agriculture Bulletin 34 : " MUSHROOM GROWING." Published in 1950 by His Majesty's Stationery Office at 3/6d.

NEW LIFE MEMBER

Dr. R. L. EDWARDS HONOURED

Ronald Leslie Edwards, Ph.D., B.Sc., F.R.I.C., Director of Research with the Mushroom Research Association Limited at Yaxley, has been elected a Life Honorary Member of the Mushroom Growers' Association.

Making this announcement during the Refresher Course at Peterborough on 25th January, Mr. Fred. C. Atkins said: "Dr. Edwards' knowledge of synthetic mushroom composts is unrivalled in the world to-day. He possesses, after five years' saturation in the atmosphere of mushrooms, a phenomenal grasp of the problems besetting the Industry. Life Honorary Membership is the highest distinction the M.G.A. can confer; the only other workers similarly recognised are Drs. Ware, Lambert and Sinden."

Dr. Edwards later wrote to the M.G.A. expressing sincere appreciation of the honour and added: "I regard this not only as a great personal compliment, but also as a recognition of the work of past and present members of the Staff of M.R.A.; and I do not forget the pioneers who made it all possible."

Potted Biography

Educated Merchant Taylors' School and University College, London. B.Sc., 1st Class Hons Chemistry, 1930. Ph.D. (Biochemistry), 1933, for studies on growth of yeast. A.R.I.C., 1935. F.R.I.C., 1939. Head of Biological Laboratory, R. Silcock & Sons Ltd., Liverpool, 1935. Chief Chemist, British Fermentation Products Ltd., Ipswich and London, 1940-45. Member of eight scientific societies, and at various times of some of their Committees. Gas Identification Officer and Warden with Civil Defence Service in Liverpool, Ipswich and London during 1939-1945. Appointed M.R.A. Director of Research, 1945.

List of Publications

Food Value of the Mushrooms. 1946, M.G.A. Year Book.
The Mushroom Research Association. 1946, M.G.A. Bulletin No. 4.
Insulation of Mushroom Houses. 1947, M.G.A. Bulletin No. 6.
Statistical Analysis. 1947, M.G.A. Bulletin No. 7.
Mushroom Research (Talk to Worthing Growers) 1948. M.G.A. Bulletin No. 11.
M.R.A. Report on Synthetic compost. 1949, M.G.A. Bulletin No. 15.
Mushroom casing soils. 1949, M.G.A. Bulletin No. 16.
Science in the mushroom industry. 1949, Agriculture **56**, 434.
Developing a Synthetic Compost—I. 1949, M.G.A. Bulletin No. 17.
Developing a Synthetic Compost—II. 1950, M.G.A. Bulletin No. 18.
Mushroom Growing in Denmark. 1950, M.G.A. Bulletin No. 18.
On the Insulation of Mushroom Houses. 1950, M.G.A. Bulletin No. 18.
A Visit to Holland and Belgium. 1950, M.G.A. Bulletin No. 19.
First International Conference on Mushroom Science. 1950, M.G.A. Bulletin No. 20.
Developing a Synthetic Compost—III. 1950, M.G.A. Bulletin 21.
Research Programme. 1950, M.G.A. Bulletin 22.
Factors Affecting Comparisons between Yields. 1950, Mushroom Science—I.
Some Factors Affecting Fructification in the Mushroom. 1950, Mushroom Science—I.
A Design for Mushroom Cropping Experiments. 1950, Mushroom Science—I.
Synthetic Compost. 1950, Mushroom Science—I.
With Dr. C. J. La Touche: Hygiene on the Mushroom Farm. 1948, M.G.A. Bulletin No. 11.

Electricity on the Mushroom Farm

Mr. D. J. Maitland, addressing a Horticultural Conference arranged by the Berkshire N.A.A.S., spoke on Electricity on the mushroom farm.

Dealing with his mushroom shed, he said that it covered 3,000 cu. ft. and was sunk 2 ft. 6 ins. into the ground. The roof was of corrugated asbestos lined with flat asbestos, and the space filled with vermiculite. There were three tiers of beds on either side of a centre

path which added up to 450 sq. ft. He used an aerovap and lighting, but no peak heating, which he thought was unnecessary. The average cost was 2s. 6d. for 24 hours, and he did not believe anyone could do it cheaper. When it was first switched on, a lot of electricity was used, but the insulation was good, and a steady temperature of 78 deg. could be maintained with just over four kilowatts when it was freezing outside.

The aerovap was filled with BHC and DDT, and the deposit from it went right through the beds to a depth of two inches. With the aerovap in use he had no pests whatsoever, and there was no taint.

Mr. A. W. Gray, of the agricultural electrification section of the British Electricity Authority, introduced a new note into the conference when he suggested that many nurseries in the country were without adequate lighting. From four o'clock onwards during the winter months, he said, the utilisation of labour was poor because of the absence of ordinary lighting for the man to work by.

Growers said that it cost a lot to instal lighting and there was not much benefit, but that was not so. He instanced a case where a grower employed 12 regular men who " just pottered about " from four until five-thirty. To put adequate lighting in every part of this nursery would cost £200. It would be £200 capitalised over 10 years—£20 a year. His labour cost 16s. an hour for the 12 men and he was wasting 24s. a day after dusk. It would not be long before he had covered the cost at that rate, while the electricity used would be about 1½d. a day.

He backed electrical space heating in mushroom sheds, but not soil warming in tiered beds where the artificial heat seemed to break down the bacterial action and dried out the beds.

(Reproduced with grateful acknowledgment to the Fruit Grower from the issue dated 7.12.50.)

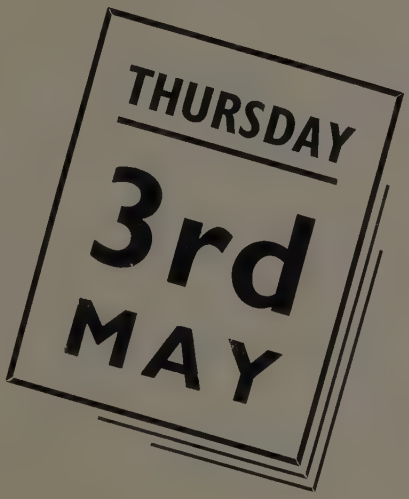
With grateful acknowledgment to the Daily Express

By the Way, Beachcomber!

There is a warm argument going on at the moment over the rival claims of the long-established, home-made Bordeaux Mixture and the new American Parzate or Dithane Z. 78—both zinc salts of ethylenebisdithiocarbamate—as a means of controlling parasitic mushroom Diseases.

Beachcomber, of the *Daily Express*, has this pertinent comment to make : " Through the storm-clouds there steals a wan shaft of light. *Nunc pede libero* . . . . . In a Bacchic frenzy the Chamber of Commerce Journal has announced the exemption from Customs duties of Zinc Ethylenebisdithiocarbamate. *Antehac nefas depromere Caecubum* . . . . . No longer will it be necessary to stuff your boots with zinc ethy., etc. before you land in England. No tooth-brush case will be searched for this delicacy. No stammering, red-faced traveller will be asked to tear out the lining of his waistcoat. " Anything to declare ?" " Ha ! Nothing. Have a bit of zinc."

MAKE A NOTE in your Diary to come along to YAXLEY on . . . . . .



. . . . for the Research Station's OPEN DAY and the M.G.A.'s Second TRADE SHOW

TICKETS for the Lunch are available from the Secretary at 6/- each

The Programme, giving full details of the TRADE SHOW and exhibits, 'bus and train times, will be sent out to all members this month

Aspects of the Tray System—1

By

Capt. GILES TWEEDIE

Captain Giles Tweedie is an ex-Serviceman who started growing mushrooms in shelves immediately after demobilisation. He soon went over to trays. He brings a keen mind to bear on this system, and has been prevailed upon by the Editorial Board to comment in this and subsequent issues on his experiences.

I have heard of many growers converting to Trays, other die-hards refusing and alas perhaps another group, at first enthusiastic, returning again to " the old way of growing." It is not my part to figure all this out but, perhaps becoming dissatisfied with conditions and their efforts on one track, they seek refuge on another. I was on shelves ; now I am on trays and, despite a good few headaches, intend to stick to them.

Buildings. These vary enormously from farm to farm. A completely successful cave grower would laugh at me if I suggested he would be better in mushroom houses.

Nevertheless, I cannot but feel that the speed and evenness of spawn run in a well-insulated Heat Room would pay dividends, be the compost put in the corner of the garden, in disused tunnels or a super mushroom house. Enlarging doorways, altering ground levels and such major adaptations call for considerable expense in labour and capital. However, such changes may be absolutely necessary to insure smooth running.

Heat Rooms. First-class heat rooms should be erected by qualified builders. They are the nerve centres of the plant and should where possible be " rooms " rather than " houses " with interior rather than exterior walls. Most growers would agree with me when I say it is economic to have heating pipes as well as live steam arrangements in such buildings.

Trays. You can buy good trays which with care will last for years. The cheaper varieties can prove to be very dear. Lightness must be considered ; buy trays NO LARGER THAN 2′ × 2′ 6″. If they are light (and you are strong) you will be able to handle these by yourself even when cased. I think $\frac{5}{8}$″ timber quite heavy enough and there is no need to pay a penny more than 1/6d. per sq. ft. for an excellent tray. If you get treated trays remember that it takes 6 weeks for them to dry out. (They are dreadfully heavy when still wet). After that they should be treated to prevent any reabsorption of moisture ; some preservatives do not waterproof the surface of the wood, and the moisture loss from the compost through the wood can be significant.

Composting and Filling. I am NOT prepared to agree that an equally good compost can be (consistently) prepared from a 6 to 8 ton delivery as from 12-14 tons. Be this as it may, a larger stack is worth considering, though it may of course affect the size of Heat and Production Rooms. Most growers use long manure and pep it up with activators, but the chief problem still remains, namely, how to pack into a 5″ tray sufficient nutriment to last 6 to 8 weeks and give 5 or 6 good flushes without a dip in production after the 3rd or 4th flush. Perhaps a special technique is required? Should we chop the finished compost?

Peak Heating. Heating pipes and live steam help to raise the temperature to 120°—130° F., and in the confined space close attention must be paid to the compost temperature to make sure it does not rise above 145°. **The top trays are not necessarily the hottest,** and sometimes the second or third down are as much as 5° to 8° warmer. I have also found that under fairly normal conditions **the second tray down tends to become the wettest** unless there is exceptional condensation. I would suggest that the driest compost is put in this second " row." Fumigation is undoubtedly advisable at the " peak."

Spawning and Spawn Run. We like to spawn within 48 hours of opening up. We plant manure spawn in the beds at the rate of 1 quart to 36 sq. ft. We have, of course, to move the trays to do this but this is considered one of the least arduous jobs to be done. We find also that although grain Spawn grew mushrooms it also grew green moulds—we also thought the mushrooms were rather smaller with the grain, but this was not confirmed. A thermostatically-controlled electric boiler producing live steam allows us to get a good spawn run in 10-14 days. It is rather expensive to run and " cuts " are a nuisance, but its other advantages amply compensate.

Reproduced with acknowledgments to the Kennett Square, Pennsylvania, News and Advertiser, 1950.

Manure Racket in U.S.A. Allegations

A report on alleged shortweight racketeering in mushroom manure is being studied by the State Bureau of Standard Weights and Measures at Harrisburg. The report was submitted after an investigation carried out by state police and James Fox, Jnr., Phoenixville, Chester County weights inspector.

Fox, who prosecuted some manure truckers for shortweighing earlier this year, and the police investigated charges that truckers were charging the growers full weight prices for watered manure.

The Internal Affairs Department stated that no arrests were made because the reported watering-down process was performed outside of Pennsylvania. The manure usually is sold by bid at race tracks outside Pennsylvania and brokers then re-sell it to truckers or directly to the mushroom growers.

State Senator George B. Scarlett has charged that the racket has cost Chester County mushroom growers an estimated $1,200,000 a year. He said weight shortages have run as high as 48 per cent.

MEMBER'S ADVERTISEMENT

SMALL STUD FARM of 19 acres, near Newmarket. Small Mushroom plant installed, ample buildings convertible to 14,000 sq. ft. growing space. Two all-electric Flats. Double-storey building convertible to house. Garages, Vegetable and Wall Gardens. FREEHOLD £8,000 or in lots. Apply M.G.A.

Mr. A. DeB. Hovell, *of Church Farm Nurseries, Rustington, Sussex, last year's Chairman of the M.G.A., wrote the following article in The Grower of 16th December,1950. It is here reproduced by kind permission of the author and of the Editor of the Grower.*

A Mushroom Manure Turner is Born

Like all engaged in horticulture the mushroom growers' major problems are cost of production, higher wages, dearer materials, and lower returns for our produce. This is becoming general throughout our Industry.

Turning manure by hand is a long and hard task, particularly when the manure contains a great deal of long straw.

So last spring we began looking for machines to help us.

Gilbert Rice Ltd., Agricultural Engineers, of Horsham, Sussex, kindly sent us a Fordson Major Tractor fitted with a Compton Hydraulic Loader.

This machine quickly proved itself capable of doing large amounts of work.

The difference between a manual fork and a machine fork is shown in the photograph. It seems no exaggeration to say that it will do the work of ten men.

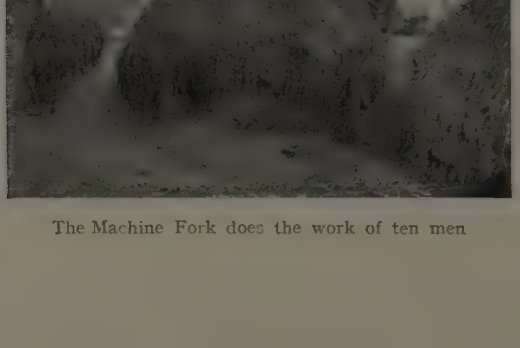
The initial cost is a little over £500.

At first we feared that turning the compost in such large " forkfuls " would not properly aerate it. Events showed that our fears were groundless, as the first house of mushrooms grown from manure composted by this method was successful.

Pleased as we were with the initial trials, we were not satisfied. My brother Charles thought of using a power-driven manure distributor.

Gilbert Rice then sent us a Salopian, which has quite a large body and is priced at £213. It is often used by farmers.

The compost can easily be dumped in the Salopian by a mechanical lift, the necessary water and gypsum added and the compost is spun out of the rear of the machine in a pile.



The Machine Fork does the work of ten men

Some form of simple shield is needed to prevent the compost being flung about too much.

When we brought this machine into use, which we operated with our 1940 Fordson Tractor, it was obvious that we had the answer to our problems.

Mr. Harold Boxall works a Salopian Manure Distributor by Electric Motor

Manual labour for turning compost could be a thing of the past.

Superior compost.

It is outside the scope of this article to discuss compost and it must suffice to say that the compost is superior to anything turned by hand.

From using this mechanical loader for turning manure, to loading trucks for running in to houses, and to digging casing soil was an easy step.

All the staff have enjoyed watching this powerful machine effortlessly doing the work which before had given so many backaches.

Mr. Harold G. Boxall has adapted a Salopian Manure Distributor to run with an electric motor, in a most ingenious manner as illustrated, and has achieved a big saving in man-hours.

Several growers are now following his lead. Incidentally, it was Mr. Boxall who first thought of using coke braziers to help peak-heating, a practice which has been universally adopted.

(Mr. Hovell's mushrooms grown on mechanically composted manure won two first prizes and the Sir Charles Barrington, Bart., Challenge Cup for the finest mushrooms in the Worthing Autumn Show—Ed.)

Mr. J. R. Ashton, of Southport New Road, Tarleton, Lancs., wrote in *The Grower* (23.12.50) : Mr. Hovell's article . . . . . was no doubt very interesting to the larger mushroom growers. Could our midwifely editor now publish an article about a machine or machines for manure turning which the majority can afford.

(*The Grower* Editor commented : Has anyone tried adapting a rotary cultivator ?)

Then **Mr. J. R. Thompson,** of Stapleton, Darlington, sent in this letter (30.12.50) : I was very interested in Mr. Ashton's letter on small machines for manure turning. I do not see why I should have to fill a barrow by hand and push it while the Rototiller is standing idle. Some form of power lift is needed on these small tractors.

They can, of course, be fitted with a trailer, but my experience of these is that it takes less room to turn a Fordson round, and pulling a load is a very small part of the work that they should be able to do.

I believe that if a lift similar to that fitted to " fork trucks " could be used, it could take a good deal of the heavy work off smaller growers' hands.

Provided the machine was really manoeuvrable, a barrow load at a time would be a very useful load, especially as distances would be short.

A rotary cultivator may not be suitable for turning mushroom manure, as it may break up the straw too much.

In the meantime **Mr. Fred. C. Atkins** sent to *The Grower* " one or two observations on Mr. Hovell's article, as my colleague Mr. Ben Noble and I have given much thought over the years to the mechanization of the expensive composting process." These " observations " were not published in *The Grower*, but a copy was later sent to the M.G.A. office, and is printed below, since it raises certain points which may stimulate constructive argument :

1. It ought not to be deduced from Mr. Hovell's statement (that compost prepared by his enterprising combination of machines " is superior to anything turned by hand ") that this is likely to be so invariably—or even frequently.

2. It is highly important that all parts of stack occupy the central upper section at some stage of the process. It would be idle to pretend that this can be assured with a Compton hydraulic loader used as illustrated.

3. In the United States the blame for the serious increase in the incidence of eelworm infestation of mushroom beds is attributed in part to the imperfections of composting inseparable from the use of crude mechanical grabs which transfer the compost to the turning, shaking or mixing machines.

In summary, then, the saving in manhours resulting from the introduction of machinery such as Mr. Hovell describes must be carefully balanced against the two facts that (*a*) the grading or positioning of the compost at each turn is no longer possible, and (*b*) the danger from diseases and pests, particularly eelworm in ground-beds, would tend to increase.

(As a footnote, here is what **Dr. A. M. Kligman** says in the excellent new Swayne " Handbook of Mushroom Culture," just published : " When mechanical turners are used one must be certain that the water source is adequate. That is, the manure can be turned faster than it is possible to water it during the turning . . . . . The advantages of mechanical turning are offset if this consideration is neglected.")

Publicity : The M.G.A. has re-constituted its Publicity Sub-Committee. It now comprises Messrs. J. E. R. Simons, A. DeB. Hovell, F. L. Filmer and W. A. B. Harding.

Executive Changes : The M.G.A. Executive has lost the valuable services and unfailingly practical advice of **Mr. C. P. Chamberlain,** of Trowbridge, Wiltshire, who has resigned for domestic reasons. **Mr. G. W. Baker,** of Oxted, Surrey, has been appointed to fill the vacancy until the end of the current year.

At the Annual Meeting of the M.G.A. last October, **Mr. Harold G. Boxall** was elected to the Executive Committee. Mr. Boxall is Director of G. W. Boxall & Sons Ltd., who have about three acres of glass and 24,000 sq. ft. of mushroom beds at Angmering and Thakeham in Sussex. He is a Director of the M.R.A. and is very active on local N.F.U. affairs, serving on no fewer than four or their committees, as well as being a Director of Farmers and Growers Industries Ltd., the Worthing Growers' Co-operative.

CONGRATULATIONS

Mr. Angus Watson, M.G.A./M.R.A. Secretary, was married quietly at Glinton Parish Church, near Peterborough, on 5th March, to Miss Elizabeth Brooks. All members wish them both every happiness.

VENTILATION

By Lt. Col. E. NOEL

In the U.S.A. a minimum of two changes of air per 24 hours is suggested (with a ratio of 1 sq. ft. of bed to 5 cu. ft. of volume of house).

Other authorities recommend as many changes as possible, provided it does not result in draughts or sudden fluctuations in temperature and the cost in fuel is not increased.

There seems little danger of the latter eventuality. If we take the case of a 12,000 cu. ft. house and assume that the air has to be heated 10° F., the cost of heating one change will only be ½d.

Many growers rely on natural ventilation which depends on :—

1. Difference in temperature between air in the house and outside.
2. Vertical distance between the inlet and outlet ventilators.

In winter natural ventilation will suffice. A difference of 6° F. and 8 ft. difference in level between the ventilators will give a velocity of 7,200 cu. ft. per hour. To ensure, therefore, one change of air per hour will require ventilators 1·63 sq. ft. in area. In practice the area might have to be more, but there is no difficulty or real expense in increasing the area to any limit needed.

In the case of peak heating the air velocity will be 32,000 cu. ft. per hour.

In spite of the above considerations some growers instal fans to overcome the baffle effect of the shelf beds and to help in evaporating moisture from the caps of the mushrooms. Whether this is really

necessary in winter seems doubtful as a similar movement of air could be attained by increasing the area of the ventilators.

Obviously natural ventilation cannot be relied upon in summer. A definite need for a fan arises, but the ordinary run of fans seems too big.

Many growers have Handcraft huts of 5,000 cu. ft., and a fan of 2,500 cu. ft. displacement would seem ample ; the smallest fan sold by Ventaxia displaces 7,000 cu. ft. per hour (25 watts). Darlington in *Mushroom News* No. 3, Vol. 2, give a list of G.E.C., the smallest of which has a displacement of 29,000 cu. ft. per hour.

There are, however, available from Army Disposals, small fans as used in armoured cars and tanks. It is difficult to judge the displacement, but according to the current consumption the air displacement must be between 2,000 and 3,000 cu. ft. per hour.

A grower using houses 90 ft. long, 17 ft. wide and 8½ ft. high (to crown of arch) finds that the mushrooms at the end opposite to the fan suffer from lack of air.

It is generally accepted that the ideal ratio of bed area to volume should be 1 to 6. Can this ratio be reduced if ventilation is by fan ?

PRESS CUTTINGS

Observations in some pine and spruce forests near a lime factory in Virkkala (Lohja, S. Finland) indicate that the fine **lime dust** spreading on a large area from the factory chimney is probably causing some anomalies in the mushroom flora. Many species characteristic for such sites (e.g., *Lactarius rufus, L. trivialis, Boletus variegatus*) were absent, and *Psalliota abruptibulba, Tricholoma nudum, Lactarius deliciosus* and *Clitocybe nebularis* were found frequent and abundant ; they are not commonly seen in such forest types with *Calluna, Vaccinium vitis idaea,* etc. Dr. T. RAUTAVAARA, in *Karstenia, I, 1950.*

Many **failures** in mushroom crops can be traced to faults in management and hygiene which could, with thought, have been overcome at the start of operations.

L.R.E.M.—*Eastern Daily Express,* 13.1.51.

Spent Mushroom Manure is suitable for tomato beds if the mycelium is dead. Dr. W. F. BEWLEY at Worthing—*The Grower,* 9.12.50.

Agricultural education and research will cost the country nearly £3 m. this year . . . . . **Research** is not a prop to an ailing industry, but a ladder for a vigorous one. Leader in *Daily Telegraph,* 4.1.51.

" I wish to combat the idea that the study of **insecticides** should consist of a search for chemicals ever more potent, capable of killing all living organisms, and then taking them into the field and eliminating every animal present—perhaps the men who are applying them . . . . . I conceive of the study of insecticides as a search for precision weapons

to destroy selectively harmful insects, and specificity, while it presents many difficulties, is in fact the basis of that selectivity."
Dr. C. POTTER at Royal Society of Arts—*Nurseryman & Seedsman*, 18.1.51.

A little while ago we had the privilege of attending a luncheon arranged by the Mushroom Growers' Association. That we enjoyed the menu planned by M. André Simon, the distinguished President of the Wine and Food Society, goes without saying. But we were equally impressed by the **background of skill and knowledge** that lies behind the professional activity of growing these delectable trifles . . . . . We feel respect and gratitude for the professional growers. And our only wish is that they would develop a strain that will not shrink to half its size when cooked. The Editor, *Good Housekeeping*—December, 1950.

A cluster of mushrooms weighing more than 100 lbs. was discovered in Mountains at Nakatsu county. This **gigantic mushroom growth** is the largest of its kind ever to be discovered in Japan.
Nippon Times, Tokyo, 8.10.50.

The weight of a consignment plays an important part in the sale of goods and growers should know how the weight is dealt with when carried by rail . . . . . **Computed weights** save considerable weighing costs. The trader must keep a careful watch to see that any weight reductions in packing material are not overlooked.
The Grower, 30.12.50.

We have, by a series of experiments on crops such as apples, lettuces, **mushrooms,** potatoes, peas, cereals, sugar beet and radishes, been able to establish the beneficial effect of the addition of co-reacting **vitamins** to growth-regulating and other **hormones** . . . . . We intend to carry on with the mushroom experiments and a further number of trials has already been started.
G. L. HEY & P. P. HOPE in *The Grower*, 13.1.51.

Angelo Brustolin, of Avondale, has been elected organization president ; Joseph Venito, of Kennett Square Road, Treasurer ; and Mrs. Arece Lambert Anderson, of Coatesville, Secretary, of **AMI**, newly organized and intended to represent the entire American Mushroom Industry. John DiCecco, of Avondale, is first President. Mushroom Growers' membership fees will amount to one-fourth of a cent per square foot of growing space while spawn growers, packers, truckers, canners and others will be assessed according to the size of their business with a minimum of 60 dollars and a maximum of 500 dollars per year.
Kennett Square, Pennsylvania, News & Advertiser, 1950.

The present most popular units for (mushroom) **packages** are the ½ lb. and 1 lb. sizes. *Pre-Pack-Age* (U.S.A.) September, 1950.

For use as a **flavouring** material, mycelium of the commercial mushroom, *Agaricus campestris*, is grown in aerated liquid media . . . . . To develop a good mushroom flavour it is necessary to continue fermentation 1 or 2 days after all the sugar has been consumed.
H. HUMFIELD & T. F. SUGIHARA, *Food Technology*, 1949.

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Finland to Export Mushrooms?

BY ARMO ARO

The crop of edible mushrooms in Finland as a rule is rich. Some autumns might be dry with the consequence that there will be insufficient supplies which do not cover the demand at home. The crop would surely be each year sufficient to meet the demand at home and abroad if there were a great interest at various places in the picking of mushrooms and if the businesses could see their way to stock mushrooms during the years when the supply offers opportunity to do so. Such a procedure has, however, regularly brought losses, because the barrels to be used have not been so tight as provided for by stocking.

There are in Finland quite a few places where the picking of mushrooms is popular. Say 90 per cent. of the whole country represent districts where only a few care to take mushrooms, and even these only for own consumption.

The main picking places for trade are in Uusimaa and Savo. In the isthmus of Carelia large quantities of mushrooms were gathered and the displaced population from Carelia has continually gathered mushrooms at their new dwelling places.

The most prominent mushroom districts of Uusimaa are Loppi, Pusula, Nummi and Somerniemi, and in Savo the neighbourhood of Kuopio, Siilinjärvi, Lapinlahti, Varpaisjärvi, Maaninka and Vehmersalmi, and the districts around the lake Saima.

The mushrooms coming in the market are received from the above districts. Those coming from the district of Kuopio are considered to be the best ones, because there are obtained *Lactarius trivialis* and *Lactarius torminosus* and the assortment is fairly good.

The mushrooms are sold as salted. Dried mushrooms and mushroom powder are not popular. Fresh mushrooms are sold only at the market places of towns and townships.

Enquiries from Middle Europe have from time been made as far as salted mushrooms are concerned, but only few purchases have been concluded.

If salted mushrooms are to be exported, there should be stocked supplies of the same so that respective firms at any time could be able to deliver them.

The percentage of salt of mushrooms is in this country very high, varying between 12-15%. If the preservation conditions could be improved (which seems to be probable) the percentage of salt may be reduced to 8-10%. Then the selling possibilities to foreign countries perhaps would be better.

People of this country are not accustomed to use dried mushrooms, although the storing and preservation of them would be easier. As far as mushrooms should be exported, the salting and packing should be improved and the assortment has to be made more carefully. All these measures would also promote the marketing possibilities on the home market.

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New American Textbook

Dr. R. L. Edwards Reviews Dr. A. M. Kligman's Handbook

This Handbook* was written by a scientist with considerable experience of research and the commercial side of mushroom growing in America. Although it tells the American story very completely, some parts of it are not directly applicable to British conditions, methods and outlook. It is not suitable for use by the average British Grower as a practical " What to do " book, but offers comprehensive discussions and opinions on " How and Why " various processes are carried out, mainly in America.

Anyone who is interested in these aspects, likes talking or reading **about** mushroom growing, and does not mind occasionally disagreeing with the author, will probably enjoy Dr. Kligman's book. I should have enjoyed it very much more if it were not spoiled by far too many misprints. Most of them are trivial, the result of careless proof-reading which is bad enough, but a few are more serious such as the statement on page 310 that cecid larvae " may produce within themselves many young worms ; and Phorid flies." Apart from this fault the book is well printed on good paper, and in the edition with a hard cover, a good binding. There are over a hundred excellent photographs and drawings.

The preface to the first edition, with its warnings against difficulties of growing and reliance on books, should be taken to heart by all new growers. The first two chapters describe the history of mushroom growing and present conditions in America ; the next two give a brief account of buildings, heating, refrigeration, and equipment, again mostly in America. Chapter 5 describes the life cycle of the mushroom, and Chapter 6 its nutrition, mainly on the basis of mycelial growth in pure culture, though some observations on mushroom production are included.

Then come five chapters (80 pages) on various aspects of mushroom compost, giving a more detailed account of this subject than I have seen in any other publication. Dr. Kligman frankly recognises, as we all must, the empirical nature of the traditional composting process, which is well described, though I think few growers in this country make their stacks 20 to 50 feet wide, and our maximum width of about 10 feet is described as the minimum in America. The effect of aerobic and anaerobic fermentation in relation to the shape and size of stack is well described, leading to the short composting process. The value of gypsum is acknowledged although, following Treschow, Dr. Kligman does not wholly accept Pizer's explanation of its effects. It is confusing to read that superphosphate can be used " in precisely the same manner as gypsum, as its effect on the compost is identical," followed by a caution against using too much. Superphosphate contains 40 - 50% of gypsum, but the other 60 - 50% is quite different, being an acid calcium phosphate quite capable of acidifying and unbalancing the compost if used in excess, whereas gypsum is unlikely to do either of these things.

*Dr. A. M. KLIGMAN : Handbook of Mushroom Culture (published by J. B. SWAYNE, Kennett Square, Pennsylvania). Stiff cover 32/-, Soft cover 24/-.

The whole process of peak heating, particularly by the use of steam, now apparently very common in America, is well described. Steam would probably be a useful asset to any British grower for peak-heating, cleaning between crops, and on some farms for soil sterilisation, but more skill is probably needed in controlling it than one might conclude from this book. The chapters on additions to manure and synthetic composts deal largely with materials not available to the British grower.

On spawn Dr. Kligman says that by and large, results with grain spawn are similar to those obtained with other kinds. It gives a quicker run, and goes further, but may give small mushrooms. There is a long chapter discussing the properties of casing soil without reaching any strikingly original conclusions. In this we are all in the same boat with Dr. Kligman. In America casing soil is usually sterilised by steam, formalin, or both, and methods are described. Chapters on bed management, rejuvenation, marketing and food value call for little comment, though I agree with Dr. Kligman that the mushroom should not have to compete in the vitamin market. " It would be cheaper to buy a vitamin pill but not half so tasty."

The advantages of the two-zone (tray) system are listed as decreased cost of production, continuous cropping (many American shelf growers take only one crop a year), increased number of crops, economy in manure, better disease control (I question some aspects of this), more certainty of a peak-heat ; with the comment that " There are of course disadvantages," many arising from inexperience, such as labour of handling trays, breakages, and need for careful planning. The system is well described and illustrated.

A long chapter deals adequately with the main diseases and weed fungi with emphasis on prevention and the importance of good compost and cultural conditions. Steam plus formalin is recommended for preventing carry-over of verdigris (*Myceliophthora sp.*) which is described as occuring with explosive suddenness, in some instances exceeding all other diseases in importance. One of the new dithiocarbamate fungicides, not commercially available here, is recommended for the three main parasitic diseases, and formalin for most other purposes.

The chapter on insect pests is nearly all about DDT. Either it kills them or it does not. Perhaps we are in rather a similar position with BHC, which happily does kill more of them. Some of the new insecticides are mentioned as possibilities of the future but I think we may be ahead of the United States in this field.

There is quite a good account of eelworms which are probably killed by moist heat at 130° F. for 2-4 hours. Infested houses should be steamed at 140° F. **before emptying** to avoid spreading the pests.

Two minor failings in the book are a tendency to repetition, and an incomplete bibliography. References to original publications given at the end of each chapter do not always include all those mentioned in the text.

In conclusion, I should say that Dr. Kligman's book may be read with pleasure by anyone interested in mushroom growing, with profit by many growers willing to select, absorb, or reject parts of it according to their circumstances, but not by anyone who wants to be told as simply as possible how to grow mushrooms.

FORSOOTH, Mr. Beveridge !

Mr. John Beveridge, of Kinross, Scotland, sent us these observations :

In the January Bulletin Mr. Middlebrook says he believes **trays** have no advantage. We have gone over completely to trays because our shelves were six (and, in one room, nine) beds high and we did not like working 16 to 20 ft. above the ground. (Girls filling in the holes after trashing sometimes dropped their empty pails, and it was fortunate no-one was below). We use boxes 2 ft × 1 ft. × 8 in., and find they can be handled with ease by one man.

To show how good is Canadian Red Cedar for bedboards, ours date back 20 years and most are in good condition. Our Celcurised boards go back 16 years and are also still good. We sent them all to be cut up and celcurised again and made into 22,000 boxes.

The great advantage with trays is that we can clear them out of a shed very quickly. A shed can be emptied, disinfected properly, and filled again with cased trays within two or three days. We get fungus diseases and insects, but we did in our shelf beds. If a grower has shelves in a house it would be worthwhile shifting on to trays, as he can get twice the square footage if he builds peak-heat sheds.

Is peak-heating really necessary ? In 1940 we had a shed without any heating and put 9 in. beds on the concrete floor. The temperature of the beds never rose above 90° F., and they were cased with earth from the roadside. We got 2 lb. to the square foot. We've not had a 2 lb. crop since. We don't weigh stems.

Incidentally, trays seem ideal for Cecid larvae. Cecids were still alive two days after boxes had been passed through a bath of hot water and Lysol. Perhaps by sending such trays intact to the research specialists they will be able to produce a cure and put an end to such merciless invaders. (It would be interesting to know why the large Sussex mushroom growers are not members of the Research Association).

A conundrum : How many pounds of mushrooms do we require to sell at 2/6d. lb., with a profit, from wheat straw costing £6 a ton, Activator costing £10, coal 70/- ton, men's wages £6 or more a week, and everything else expensive. Last year we had an offer of baled wheat straw loaded at Cambridge for 30/- a ton. But rail freight was £5 10s. a ton. Forsooth, och awa wi ye !

THE CRISIS IN HORTICULTURE

Among items of interest to mushroom growers at the Annual Meeting of the National Farmers' Union in London, in January, were the discussions on the crisis facing Horticulture.

The Grower (27.1.51.) : Determination to get better conditions for growers was a feature . . . . . At the end of a resolution calling for a plan to give the producer stability, **Sir James Turner,** President of the Union, said : " We are fully concerned at headquarters with the serious position of the horticultural industry. We are determined that the head of the Government must know the position. We have submitted the case of horticulture to the Prime Minister. He has decided that the

Treasury shall receive our deputation. The Treasury is above the Ministries of Food and Agriculture and the Board of Trade. The case and the deputation will be taken to the Treasury in the immediate future. Agriculture and Horticulture must stand or fall together. We shall not rest until we see the 1947 Act implemented for horticulture."

The Nurseryman & Seedsman (25.1.51.) : After referring to the " grim international situation " which dictated that " every ounce of food must be won from the land of this country," Sir James concluded : " One great paradox in this all-out food drive is the treatment that is being accorded to the horticultural section of our industry. We have the glaring inconsistency of growers being exhorted to increase their investments and expand production while the home markets are being glutted under an exaggerated trade liberalisation policy. I have no doubt that the grave situation now facing horticulturists will be debated very freely during this meeting, and all I would say at this juncture is the N.F.U. is absolutely solid in its determination to see that British horticulture is not undermined by sharply divergent policies within the Government itself. We cannot in this country expose any branch of food production to the danger that now confronts horticulture without showing disregard for the real dangers that face the nation as a whole."

The Fruit Trades Journal (27.1.51.) : **Mr. Eric Gardener** revealed that a draft vegetable marketing scheme was to be examined by the Vegetable Committee at its next meeting—and warned the conference that the problem of vegetable marketing was probably greater than in any other section of the industry. He went on to refute most strongly any suggestion that it was necessary to have a marketing board before the Government would do anything about controlling imports, but he declared that no marketing scheme could work unless import regulation came first . . . . . Mr. Gardener insisted that no one plan could solve the problem ; there were a number of plans. Some of them, like those to improve and standardise packing and grading, were being put into effect, but they were " batting on a buyers' wicket." He was pleased that relations between the Ministries of Food and Agriculture had greatly improved recently.

There have been one or two reports recently of **Gammexane** tainting mushrooms, but excessive dosage was admitted. It is most important not to exceed the suggested strength. Messrs. Plant Protection Ltd. wrote to the *Essex Farmers' Journal* (December, 1950) saying : " Taint is not caused by the gamma isomer of BHC but by certain impurities contained in the chemical and not readily removed. This has now been overcome hence the safe employment of ' Agrocide ' Smoke Generators on glasshouse crops, etc., and of Abol Wireworm Dust for use in the autumn on land to be planted with potatoes in the spring. The reaction of different crops to BHC is specific and peculiar. Normal BHC will impair the flavour of blackcurrants and certain other edible root crops, but it will not affect such delicately flavour crops such as *mushrooms*, peaches, tomatoes, etc., etc., and it is only after careful examination of individual crops that we can make a general release for a new formulation."

R. L. O. Jackson's "MUSHROOM GROWING"

Reviewed by J. Watts

I enjoy a book that is well illustrated and sensibly paragraphed, so commenced reading Mr. Jackson's "Mushroom Growing" with relish. In his introduction he says that—"If Mushroom growing could be learnt by book alone, mushrooms would not be sold at 10/- per pound." I query the 10/-, but wholeheartedly agree with his remarks.

Logically enough the book begins with an excellent description of mushroom culture. I was very interested to note that mushrooms were given to German submarine crews in the 1939-1945 War.

Mushroom farm buildings are dealt with in detail, both growing sheds and the other structures necessary to grow and market successful crops. Sensible dimensions are given for the composting shed, including adequate head room for laden lorries, sometimes forgotten by farm planners. I am sorry he has omitted the home-made composting structure made of rough poles and corrugated iron. It is often used by growers and very serviceable.

Under the heading of "Cropping Sheds" we are reminded that "The heating pipes on either side of the house should be well secured as they will almost certainly (though wrongly) be used to stand on." How very true! Nissen huts are condemned on grounds of poor insulation, need for replacement of wooden ends and poor shape. Referring to boilers, I for one do not like running them in pairs instead of a single installation. It means higher fuel consumption and more work. This section could have been improved with more detail.

Mr. Jackson tells us that roots are not usually removed from the premises but dumped on the site and covered with soil. This practice is new to me, roots either being removed from the premises or burnt.

Reading the chapter on "Site and laying out" I had the feeling that the author was drifting away from realities. This chapter must have been intended for the grower with plenty of financial backing. A planned layout is shown in diagrammatic form, which in itself is reasonable, but who wouldn't like a good road round his farm as well as one through the middle? Running boiler pipes across a road as would appear necessary in the plan seems awkward. I would have left a space between my raw and sterile soil sheds if I had to sterilize.

I cannot agree with the idea of going to another site for casing soil unless absolutely necessary. Labour and costs would soon take their toll of capital. However, if the practice of dumping mushroom roots on the site were carried out this would of course be necessary.

Composting is fully described and very well illustrated. Four men and a boy, we are told, is ideal for turning the compost heap. Not many of us can afford to muster even this size of labour force. One paragraph deals with the merits of the various stable manures; some

mention should have been made of the quality obtained from hard-working cart horses, usually termed " heavy." I admit I have never found hay in manure harms the resultant compost but oh, what a curse ! It never rots, and haunts the heap until the end if left in.

On the carrying of compost from shed to growing house and the filling of beds, a method is described whereby seven to nine men fill 2,600 sq. ft. of bed a day. Surely this area could quite easily be achieved by three men in the same time ?

For spawning, I rather fancy the method of running marked strings along each bed has now been superseded on most farms by various forms of templates. The book contains three excellent little sketches showing how spawn should be inserted. Watering the beds after spawning and before casing is suggested. Our Research Station definitely advises against this policy.

The chapter on " Growing, Picking and Packing " is good ; so too are the illustrations. I doubt very much if an experienced girl can pick 100 lb. of mushrooms an hour ; certainly it is not very common, unless, of course, stalk cutting is omitted.

Wholesalers may or may not provide chips, but in any case most growers are very definitely against returnable chip baskets. 2 to 2½ lb. of mushrooms are mentioned as a good crop. I fully agree, but believe 1½ lb. is far more common as an average, and that more emphasis should have been made of the fact that a farm must be economical on this basis.

Now why a section for Amateurs in a practical manual on mushroom growing ? If I were a non-professional, I would not pay 9/6 for this chapter and as a commercial grower it seems an utter waste of space.

Mr. Jackson concludes this chapter by comparing the relative edible flavour of the various grades and says " No grower worth his salt would thank you for a plate of buttons." Well, give me a raw button with its sweet delectable flavour taken straight from the bed any day, in preference to our commoner friend, " the flat."

I cannot but praise the appendix on capital and costs ; but for a few minor items, I find the figure given compares favourably with my own.

I am sorry this book was called " Mushroom Growing," it is the third time this title has appeared as the main theme in the last six months. We shall tend towards confusion if it continues.

The book is not written for the well established grower, but I see no reason why he should not purchase a copy and encourage his staff to read it. The contents are written in a " down to earth " style in non-technical language. In recommending it to beginners, I do so hoping they will " sieve out " the seven men filling, five composting, six emptying, idea. The appendix alone is well worthy of their attention.

If I must have the illustrations and they are worth having, the price goes up, but even so, for a book of this nature, 9/6d. is a bit steep. A couple of bob less would have made a difference. Nevertheless, " Mushroom Growing " by R. L. O. Jackson, is well worthy of its place among our mushroom-growing books. It is published by English Universities Press Ltd.

REFRESHER COURSE

FOUR LECTURES AND A FILM STRIP

A two-day Refresher Course for mushroom growers was held at the Great Northern Hotel, Peterborough, on 24th and 25th January. A large gathering was not anticipated, and accommodation and seating for 50 was at first considered ample. Eventually 60 were registered, and a further 10 growers who applied late had unfortunately to be refused.

After lunch on the first day, **Mr. H. H. Glasscock** spoke on " Mushroom Diseases and Their Control." The second speaker was **Mr. Fred. C. Atkins,** who was also Chairman of the Course. Mr. Atkins spoke on " The Preparation of Synthetic Composts on a Commercial Scale." **Mr. B. A. Noble,** Managing Director of Noble Mushrooms Ltd., answered a number of questions on points arising from this talk.

Following tea, Mr. Glasscock presented for the first time the Ministry of Agriculture's new film-strip on Mushroom Growing.

The second day of the course was opened by **Mr. B. D. Moreton,** who discussed " Mushroom Pests and Their Control," and after him came **Dr. R. L. Edwards,** who gave hints on " How to Avoid Trouble."

Each lecture was followed by a lively exchange of views which, as usual, proved of considerable value. Mr. Glasscock's and Mr. Moreton's talks were illustrated by means of an epidiascope. A verbatim text of each paper was presented to each person attending the course.

Warm thanks were accorded Mr. Secretary Watson for organising a function which proved so successful that it may well become an annual event.

Among the many letters received by him later was the following from a comparatively new grower : " Just a line to say how much I enjoyed The Refresher and to congratulate Watson and all concerned who made it not only instructive but a good party. Mushroom growers *en bloc* I had not previously encountered ; I was very agreeably surprised."

Captain Giles Tweedie writes :

We all enjoyed our two days at Peterborough, thanks to the careful planning and foresight of those responsible. Had there been no lectures at all, it would have been well worth the modest two-guinea fee to enable us to come together and discuss all our successes, failures, plans and problems.

Our expert scientists gave of their very best as usual ; and may I respectfully renew our thanks ? But variety will inevitably be required to keep these courses alive and stimulating and I cannot help feeling that further discussions of a controlled nature (even going forward to controversial technicalities) might be a possible goal for our next Course.

What about London, just before the A.G.M. ? All desirous of attending must be accommodated next time.

I would like to hear several short talks by such people as Orritt on Trays, Noble on Composting, Edwards on Casing Soil, Middlebrook on Mushroom Houses, Atkins on the Economics of Growing—just a few examples !

NOTES FROM *Stanley Middlebrook's* DIARY

November 8. Here's how to do it. " The temperature (for growing mushrooms) should not fall below 50° F. in the cellar or shed. The manure should be steaming at the time of planting the spawn bricks. Cover the bed of manure with a 3 inch layer of mould, push the cubes of spawn just into the mould, cover the cubes with a thin layer of mould and keep the mould more or less thickly covered with straw for warmth." That was not written in 1590. It was in the *Hampshire Herald* in October, 1950. And this despite Darlingtons, Monros, Bulletin" 34," the M.G.A. and Mr. Fred. C. Atkins ! Mouldy, eh !

December 13. I have read several articles on the value of spent compost. Now why on earth do mushroom growers give the stuff away ? Surely 10/-, 20/- or even 30/- per ton, is far too cheap for such a valuable fertilizer. Writes John Fallowfield in *Fruit Trades Journal*, after commenting on the high price of straw for composting, and quoting £6 per ton, " . . . . . it does seem a dreadful price . . . . . we used to buy dung at about 7/6d. per ton . . . . . to-day there came an offer from a Mushroom Farm willing to supply us with Spent Mushroom bed at about 50/- per ton. This seems quite a good proposition," he continues " because the dung is in a very fine state of division and of course is more like terreau which we use for the French garden." Most nurserymen and gardeners are agreed that our by-product is very valuable. Thank goodness there is at least one sensible grower who has the courage to stick out for a decent price. Personally I wouldn't say that £5—£7 a ton was too dear when compared with other semi-humus fertilizers. Why can't we do something to stop growers selling at nonsensical ten bobs ? Can we all afford to be horticultural philanthropists ? In these times ?

December 14. A year ago I was allocated " Washed Smalls " for my Automatic Stoker. I complained and the Official Fuel engineer reported I needed " Singles." The allocation was amended, the report was ignored, and I was granted " Washed Smalls." Luckily I was able to obtain " Singles " despite the allocation, and have only now had to return to the " Smalls," with disastrous results. The stoker has broken down, as we expected. Frantic telephone calls to M. of Fuel and Power. Position desperate. What do they propose to do ? They will look into it. They did and found they had made a mistake in ignoring the engineer's report. I am to have " Singles." Presumably they will not now dare to repeat their question of this morning " If ' Smalls ' are no good what have you been using all the year ?"

December 15. After yesterday's breakdown, which involved my boilerman and myself in repair work till 11.30 p.m., we have to-day a complete collapse of heating on 10,000 sq. ft. of Handcrafts as a result of two colossal leaks in the take-offs from the overhead main. Reason : expansion and contraction of the long overhead line cracking the take-off joints where they pass through the wall. Cause : continued electric cuts which stop and start the circulating pump and thus give too many and too quick changes of water temperature—particularly in this frosty weather. Morals : (1) never have pipe holes through brickwork sealed up—leave room for expansion, (2) cut " cuts."

December 16. Snow and frost outside. No heat in the houses. No growth. No work. Time to sit quietly, if coldly, in the office to study the International Mushroom Conference Report " Mushroom Science —I " obtainable from M.R.A. Yaxley, Peterborough. This excellent report of papers given on a variety of topics is one of the best books ever compiled for the benefit of the practical mushroom grower. Almost every article is of absorbing interest—though I find those written in French rather hard going—and altogether I think it is the best 7/6d. worth obtainable. Its lessons learned and properly applied would be worth ten thousand times that amount over a few years. And I don't think I am exaggerating if the figure is applied to 10,000 sq. ft.

January 8. It has been repeatedly said—and I see it appears again in the latest of M. of A. Bulletin " 34 "—that the compost retains its original moisture throughout the whole life of the bed. This is hard to believe. Most of our composts come out much drier than they are when they go in or even after the heat-up. This is particularly so with Racing and very strawy composts.

January 9. Also carried forward to the new " 34 " Bulletin is the statement that 1 lb. is the average yield in large mushroom farms. It is astonishing how few people confess to less than 2 lbs. Logically this suggests some get 0 lb. per sq. ft. I wonder why and how they keep going !

January 14. I would say the part of mushroom growing about which least is known is ventilation. Movement of air alone is not enough. Neither is the introduction of fresh air alone enough. A combination of the two is necessary. Yet it is too easy to have too much or too little of the combination. It seems the requirements alter very rapidly, month by month, week by week, and perhaps hour by hour. Bottom vents electrically controlled by an **outside** thermostat might go a long way towards solving the problem.

January 22. The vexed question of encouraging new growers looms up again. " Mushroom Growers do not like to show prospective competitors around their premises " says Mrs. H. F. G. Robertson in a South African Farmers' Weekly ; " Apprentices to the Industry are usually accepted by large commercial growers on payment of a deposit of from £250 to £500 and the apprentice accepts service for six months without pay while he is learning." What is right and what is wrong ? My own view is that the only disadvantage in showing a newcomer round is the time

wasted in doing it. If a prospective grower took the trouble to make the most elaborate and copious notes of every detail of our methods it would avail him nothing—indeed our own experience of our own conditions fails us many times. The plain fact is that little or nothing can be learned in a two or three hour's visit to a Mushroom Farm. Many of us who have trained ourselves to absorb much of what we see on others' farms know from hard experience the folly of trying to copy the other fellow's methods. Very largely each grower, new or well-established, must work out his own salvation in his own conditions.

January 24. Down to 4 hours supply of fuel. Repeated, hourly attempts to obtain even a lorry load have so far failed. Latest excuse is shortage of trucks.

February 5. Experiencing a lot of trouble with the electric wiring in my houses. The wires, 3 or 4 of them, are in ½" tubing fastened to the roof inside the Handcrafts. When peak heating by means of live steam the wires expand within the tube and when, with shorts, etc., it is necessary to replace them it is found impossible to withdraw them. They have completely filled the tubes and become ' gummed ' to them. Moral : use larger tubing.

February 7. I have the most contradictory experience with outdoor beds. This season's batch, laid at normal time—round about October and November—has done nothing at all so far. On earlier occasions we have cropped fairly heavily from late December or January onwards. Up in the north anyway, this is no way of making a fortune.

February 15. Visit to Min. of Fuel and Power Regional Office re an application for an increased allocation of coal made three weeks ago to which no reply or even acknowledgment had been received. To-day they tell me they " have not considered acting in the matter." When asked what they thought of the coal position they reply " It's not at all bad." Will it improve ? " Yes." When ? " When the weather gets warmer." And next winter ? " Oh, that'll be O.K." To such a state of complacency have we come !

February 19. The other day I presented a plant pathologist with a basket of mushrooms. To-day on the 'phone he says that while he shouldn't look a gift horse in the mouth he found a considerable number of cecids in his sample. This is puzzling as our type of cecid is very readily detected and we had noticed nothing. Apparently the damage was more than usually internal and the pickers can be excused for not spotting them. Plant Pathologists have their uses !

February 21. Every grower knows he should close down foi three months now and then for a thorough rest and " decontamination." But as he can't afford it he doesn't do it. Soon the opportunity may arise. Rail strikes—no transport. Fuel shortage—no heat. Electricity cuts—no light. Meat shortage—no work. " Z " conscription—no men. Taxation—no profit, and so on. It's being so cheerful keeps us going !

CORRESPONDENCE

Many thanks for the Bulletins. They are packed with useful knowledge and thought-provoking material . . . . . At Hockley, where roughly an acre or more of glass was used for mushroom growing during the winter, cropping began a fortnight from spawning. How we managed this may be of interest. We filled 2½" flower pots with prepared compost and spawned them while the main stack was being composted. The beds were planted with the spawned compost as soon as the temperature came down to 80°. This cut out two-thirds of the waiting time and gained up to three months in a year . . . . . One's brain teems with problems new and old which, brought up in the Bulletin and commented on by others, might easily create some new line of inquiry. Always round the corner lies the unexpected, often with valuable secrets. I. W. READ.

I always enjoy—and profit from—looking through your publications, whichever of the many Yaxley offices they come from.

WALTER BUDDIN.

Congratulations on Bulletin 22. It's a topper.

Capt. G. TWEEDIE.

You invite matter as to methods of growing here (**Australia**). The N.S.W. Government says there is no need to build special houses but sheds are built—one thickness of corrugated iron, roof and sides. No ventilation is given. Crops are on floors or benches. Marketing is atrocious. The idea is to gather when fully open, pack in any old discarded box until over-full, and batten down with nails !

I. W. READ, Sydney, N.S.W.

WARNING—Fresh-sawn Oak

Mr. J. R. Thompson writes : Referring to the photograph of bed boards on page 17 in the January Bulletin, I believe I am correct in saying that these boards would have been much better if only treated one side, or not at all for one season. The trouble with treating new wood with a preservative of most types is that it seals in the sap, which itself sets up a kind of decay. Personally I should be extremely chary of using " fresh-sawn " timber, especially hard wood which will twist very easily. Many manufacturers turn out new machines, nicely painted all over, with the result that the woodwork is done in no time ; if they'd leave part of the timber unpainted so the sap could dry out the wood would last much longer. I suppose they'd then be accused of shoddy work. It would have paid the owner of these bedboards to try to dry them, by storing for some time, but it is no easy task.

Editor's Note : It is perhaps regrettable that reference was made to these bedboards being treated with a preservative. There was no wish to suggest the preservative was at fault. Indeed, our intention was to reveal that, **despite** pressure-treatment with a reputable preservative, the fresh-sawn oak nevertheless did warp and crack. The warning was, and is, against the use of fresh-sawn, unseasoned oak as bedboards.

Fred. C. Atkins Thinking It Over .....

PRE-PACKAGING

From many conversations I have had lately it seems that, despite a natural reluctance or understandable inertia on the part of many growers, and material limitations, we shall soon see a slow but definite movement towards better packing in this country. (I am not, mark you, talking just now about grades and grading).

It will not be denied that we lag far behind the Americans in our **presentation** of mushrooms. Mr. F. L. Filmer, whom I am very pleased to see on our new Publicity Sub-Committee, recently sent me a copy of the American publication, " Pre-Pack-Age," in which there was an article on this subject.

We sought permission to reproduce it in full, but have had no reply from the publishers. I trust they will not object to my quoting from it.

This article suggests that the ideal package would be one which prevented moisture loss and at the same time permitted respiration gases to escape, but asks how both requirements can be satisfied. Transparent windows which are moisture-proof " immediately become fogged, and so lose their merchandising effectiveness ; and the transpiration of the product, with gases sealed in, results in almost immediate browning."

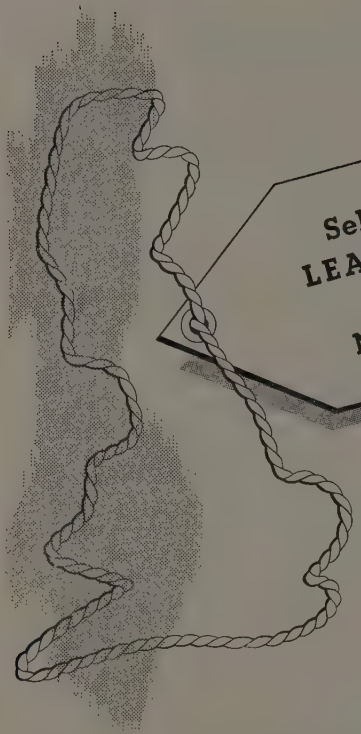
Another problem mentioned is " the fact that mushrooms continue to grow after being picked, so that if the time from packaging until retail sale extends over any appreciable period, provision must be made in the package for this growth."

The best answer in the States so far seems to be " a ventilated, two-piece telescope box." The box, having several ventilation holes of $\frac{5}{16}$" diameter in top and bottom, is " made so that the top of the carton can rise as the mushrooms become larger." The absence of any sealing " makes normal transpiration possible without bad effects."

The report continues : " Some packers use an open-window carton, and some use a film window. The film used is generally cellulose acetate because of its moisture-vapour permeability, which offsets fogging during shelf-life."

One large mushroom packager expresses the problem in this manner : " We prefer a material that permits considerable moisture to move through it in order to prevent condensation inside the package. While it is desirable to prevent excessive drying, the mushrooms need to breathe and expel a certain amount of moisture. The solution might be a compromise between a moisture-proof material and too much drying."

And finally : " Refrigeration and speed in delivery to distribution points are desirable and essential. Refrigeration slows down respiration and extends shelf life, and slowing down of the life process also aids in prevention of browning. The white natural colour of the mushroom appeals to the consumer, and every effort should be made to preserve it."



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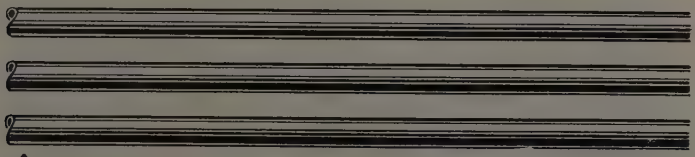

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We feel that this amply testifies to the efficiency of our sales service and the inducement thereby offered to our senders, not only to *keep growing*, but also to extend their production.

Personal attention to each grower, whether large or small, is a feature of our service, and by means of a mark, which we allocate, each sender preserves his individuality, and never becomes "just one of a crowd"

We welcome enquiries from new growers and those who wish to change their present marketing arrangements.

CHIP BASKETS and other PACKING ACCESSORIES can be supplied for immediate use.

T. J. POUPART LTD.
COVENT GARDEN, LONDON W.C.2

Tel.: TEM. 9001/8 and TEM. 7383/87

BRANCHES

SPITALFIELDS, E.1. Tel. Bis. 7444. BRENTFORD Tel. Chi. 1831

ASSOCIATED COMPANIES

SOUTHAMPTON - Tel. 3363. BRISTOL - Tel. 24255
CARDIFF - Tel. 141/142. LIVERPOOL Tel. Royal 8601

"YOU CAN'T KEEP A GOOD SPAWN DOWN"

PINKERTON'S PROLIFIC

PURE CULTURE SPAWN

Superphosphate : If any member is in difficulty over his immediate (repeat immediate) superphosphate requirements, would he send full particulars to the Secretary? We may be able to help.

VISITING DAYS : The first Thursdays in April and May will NOT be Visiting Days. Please note.

TO BE PUBLISHED IN MAY : André L. Simon's book of recipes, entitled "Mushrooms Galore," and the M.R.A. Report for 1950.

Messrs. Noble Mushrooms Ltd. have asked us to announce that their Compost Turning Machine is fully protected by Letters Patent Nos. 598424 and 627955. No-one has the right to make machines on this principle without permission, even for his own use, and in doing so will be liable to be prosecuted for damages.

LIST OF NEW MEMBERS

(Up to and including the 20th February, 1951.)

Batchelor, J. G.	Borrow House, Churt	Surrey
Bell, F.	Mere Lane, Tarleton, Nr. Preston	Lancs.
Bridgwater, W. R.	Worcester Training College, Henwick Grove	Worcs.
British & International Advertising	Bia House, Bridewell Place	London
Brown, P. C.	The Birches, The Coppice, Biddulph, Stoke-on-Trent	Staffs.
Coachwork Specialists Ltd.	292 Two Mile Hill, Kingswood, Bristol	Glos.
Denny, W. L. M.	Everglades Mushroom Farm, P.O. Lyndhurst, Johannesburgh	S. Africa
De Laszlo, P. D.	26 Hill Street, W.1	London
Dickinson, Thomas	Wholesale Market, Wolverhampton	Staffs.
Duncan, Miss C.	Mushroom Research Association Ltd., Yaxley	Northants.
Flegg, P. B.	Mushroom Research Association Ltd., Yaxley	Northants.
Kennedy, A. D.	Meadowbank, Private Road, Gorebridge, Midlothian	Scotland
Kunz, Johann	Brunigstr 2, Lucerne	Switzerland
Lendon Ltd.	Lendon House, Brudenell Avenue, Canford Cliffs, Bournemouth	Hants.
Lilley, B.	8 Alexander Terrace, Finedon, Wellingborough	Northants.
Luxmoore, M. C.	Pelsham, Peasmarsh, Nr. Rye	Sussex
Robertson, C.	Glenturret, Crieff, Perthshire	Scotland
Temple, C. W.	Highfield, Brayton, Selby	Yorks.
Unett, Lougher D.	Keston Cottage, Puttenham, Nr. Guildford	Surrey
Wilson, Major D. A.	76 Holland Park, W.11	London

CHANGES OF ADDRESS

Bangert, V. E. R.	1 Waipapa Road, Haitaitai, Wellington	N. Zealand
Dowmunt, T. M.	Holly Grove, Newick	Sussex
Gibbons, J. S.	Takeley Nurseries Ltd., Takeley	Essex
Hackett, A. J.	13 Dallow Street Old Hill	Staffs.
Heather Farm Ltd.	Horsell Common, Woking, Chobham	Surrey
Helebrandt, K. S.	Kingsley, Crieff, Perthshire	Scotland
Inachin, B.	15 Chemin de L'Orangerie, Geneva	Switzerland
Jackson, R. L. O.	Park Cottage, Doddington. Sittingbourne	Kent
Kovacs, Julius	P.O.B 587 Tel-Aviv	Israel
Noel, Lt. Colonel E.	Ashley Road Shelter, Epsom	Surrey
Stevens, J. E.	Biggeswood Cottage, Pwllmeyric, Chepstow	Monmouth.
Watts, J.	20 Keynor Estate, Sidlesham	Sussex

From its warm and steamy bed
A little MUSHROOM up and said,
"If you want us fine and strong
MANURE from STEVENS send along,
Long Straw from the Racing Stables, urinated well,
Makes us grow and also gives you larger crops to sell,
The MYCELIUM just loves it,
thus in every house or shed,
It gives the maximum of FLUSHES—
whatever type of bed."
So spoke the little MUSHROOM,
And he knows what is the best,
Just buy the SPAWN that you prefer,
STEVENS' Long Straw does the rest.

★

ROAD OR RAIL
TO ANY
DISTRICT

★

STABLE MANURE

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& FARMYARD
MANURE
ALWAYS
AVAILABLE

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Order Now for your Season's requirements

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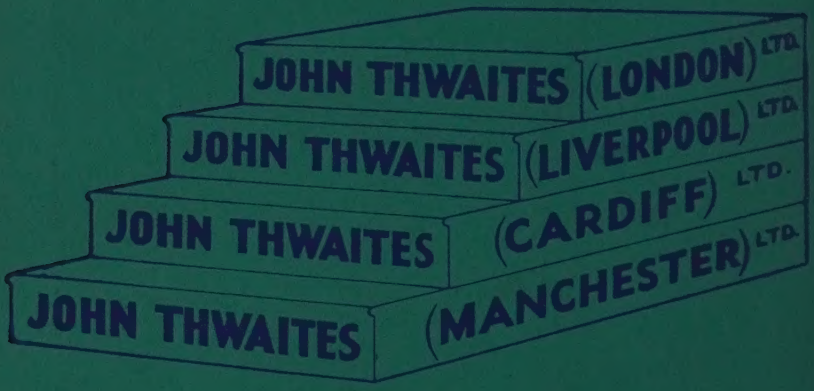

to Ensure Efficient Distribution of Your Produce...

LONDON: JOHN THWAITES (LONDON) LIMITED
COVENT GARDEN MARKET — TEMPLE BAR 4564-5 and 4980

LIVERPOOL: JOHN THWAITES (LIVERPOOL) LIMITED
QUEEN SQUARE — ROYAL 4611-2

MANCHESTER: JOHN THWAITES (MANCHESTER) LIMITED
SMITHFIELD MARKET — DEANSGATE 4826-7 BLACKFRIARS 0505

CARDIFF: JOHN THWAITES (CARDIFF) LIMITED
NEW STREET — CARDIFF 2775-4131